2.12 Angles and Shape: 30-minute Pack

GL ASSESSMENT GL · Calculators not allowed · about 30 minutes

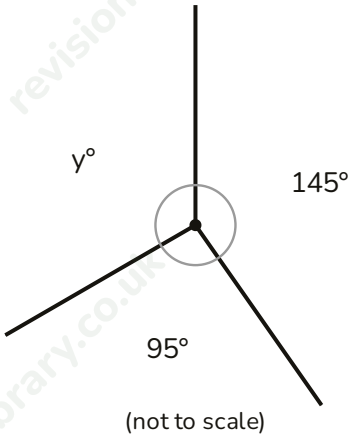
Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Three angles meet at a point: 145 degrees, 95 degrees and y degrees. Calculate the value of y.

Diagram NOT accurately drawn



(not to scale)

(2)

2 Calculate the sum of the interior angles of a heptagon (a 7-sided polygon).

(2)

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3 Euler's formula for solids states that F + V - E = 2, where F is the number of faces, V is the number of vertices and E is the number of edges.

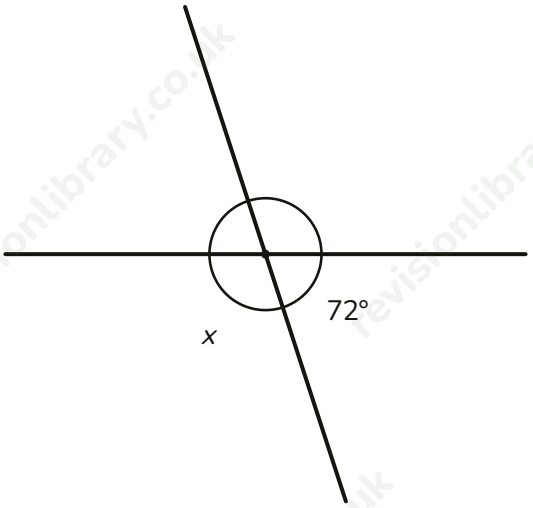
(a) A triangular prism has 5 faces, 9 edges and 6 vertices. Show that this is consistent with Euler's formula. **(2)**

(b) A different solid (for example, a hexagonal prism) has 8 faces and 12 vertices. Calculate the number of edges it must have. **(2)**

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4 Two straight lines cross at a point, forming four angles. One of the angles is 72 degrees.

Diagram NOT accurately drawn



(diagram not to scale)

(a) State the size of the angle vertically opposite the 72 degree angle. **(1)**

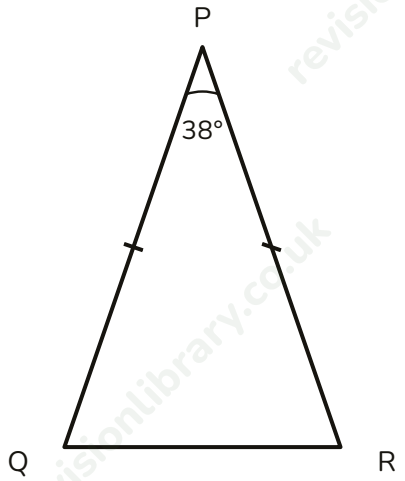
(b) Calculate the size of angle x, which is adjacent to the 72 degree angle on the same straight line. **(2)**

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5 Triangle PQR is isosceles, with PQ = PR. The angle at P (the apex) is 38 degrees. Calculate the size of each base angle, angle PQR and angle PRQ.

Diagram NOT accurately drawn



(3)

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6 Complete each statement about polygons.

(a) A polygon with 5 sides is called a _____. **(1)**

(b) A polygon with 7 sides is called a _____. **(1)**

(c) A hexagon has _____ sides. **(1)**

(d) A polygon with 9 sides is called a _____. **(1)**

(e) A decagon has _____ sides. **(1)**

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7 Identify the quadrilateral described in each statement.

(a) A quadrilateral with four equal sides but no right angles. **(1)**

- ☐ A) square
- ☐ B) rhombus
- ☐ C) kite
- ☐ D) trapezium

(b) A quadrilateral with exactly one pair of parallel sides. **(1)**

- ☐ A) parallelogram
- ☐ B) rhombus
- ☐ C) trapezium
- ☐ D) kite

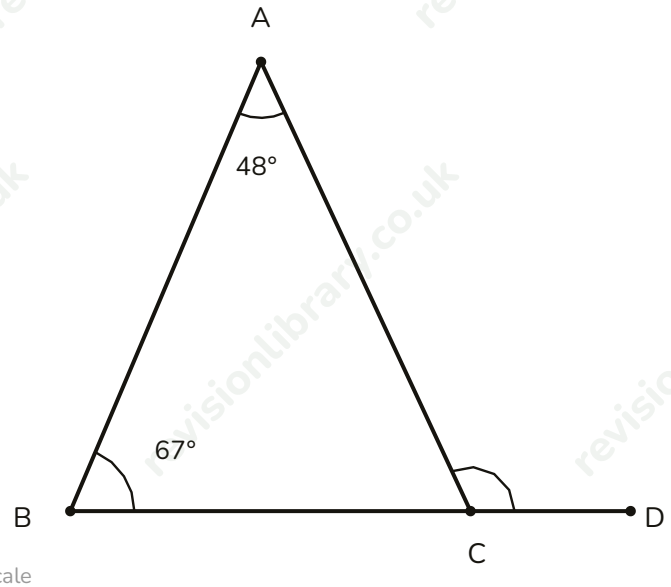
(c) A quadrilateral with two pairs of adjacent equal sides and exactly one pair of equal opposite angles. **(1)**

- ☐ A) kite
- ☐ B) rhombus
- ☐ C) square
- ☐ D) parallelogram

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8 In triangle ABC, angle A = 48 degrees and angle B = 67 degrees. Side BC is extended to a point D, so that angle ACD is the exterior angle of the triangle at C.

Diagram NOT accurately drawn



Not to scale

(a) Calculate the size of angle ACB, the interior angle at C. **(2)**

.....

(b) Hence calculate the size of the exterior angle ACD. **(2)**

.....

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9 Triangle ABC is isosceles with AB = AC. Angle BAC = 56 degrees. Side BC is extended to a point D. Calculate the size of angle ACD, the exterior angle at C.

Diagram NOT accurately drawn

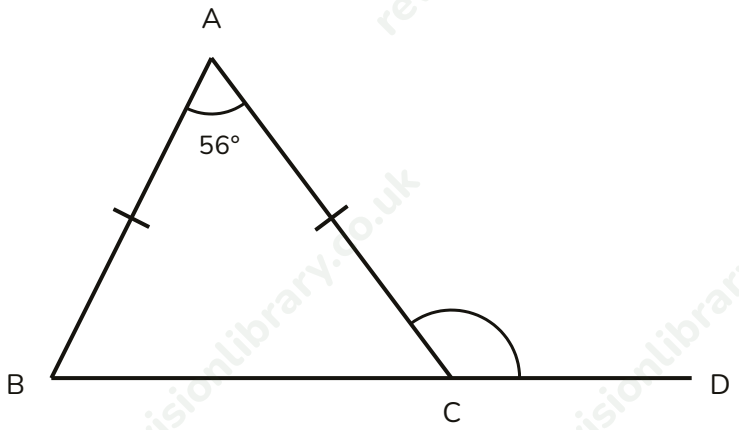


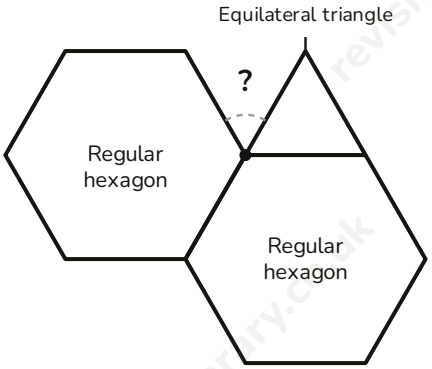
Diagram not to scale

(3)

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10 Two regular hexagons and an equilateral triangle are placed together so that they all meet at a single point, with no overlap. Calculate the size of the gap that remains at that point.

Diagram NOT accurately drawn



(not to scale)

(3)

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Mark scheme · 2.12 Angles and Shape: 30-minute Pack

A correct answer earns full marks unless the question asks for working, a method, proof or explanation.

Question 1

360 - 145 - 95 seen (angles around a point sum to 360 degrees)	**M1**
120 degrees cao	**A1**

Answer: y = 120 degrees

Question 2

(7 - 2) x 180 seen	**M1**
900 degrees cao	**A1**

Answer: 900 degrees

Question 3

(a) 5 + 6 - 9 substituted correctly	**M1**
(a) = 2 cso (matches Euler's formula)	**A1**

(a) Answer: 2 (consistent with Euler's formula)

(b) 8 + 12 - E = 2 seen, rearranged to E = 8 + 12 - 2	**M1**
(b) 18 cao	**A1**

(b) Answer: 18 edges

Question 4

(a) 72 degrees cao (vertically opposite angles are equal)	**B1**

(a) Answer: 72 degrees

(b) 180 - 72 seen	**M1**
(b) 108 degrees cao	**A1**

(b) Answer: x = 108 degrees

Question 5

180 - 38 seen	**M1**
142 / 2 seen (ft)	**M1**
71 degrees cao (for each base angle)	**A1**

Answer: angle PQR = angle PRQ = 71 degrees

Question 6

(a) pentagon cao	**B1**

(a) Answer: pentagon

(b) heptagon oe (accept septagon)	**B1**

(b) Answer: heptagon

(c) 6 cao	**B1**

(c) Answer: 6

(d) nonagon cao	**B1**

(d) Answer: nonagon

(e) 10 cao	**B1**

(e) Answer: 10

Question 7

(a) rhombus cao	**B1**

(a) Answer: rhombus

(b) trapezium cao	**B1**

(b) Answer: trapezium

(c) kite cao	**B1**

(c) Answer: kite

Question 8

(a) 180 - 48 - 67 seen	**M1**
(a) 65 degrees cao	**A1**

(a) Answer: angle ACB = 65 degrees

(b) 180 - their (a) seen, or 48 + 67 (exterior angle = sum of two opposite interior angles)	**M1**
(b) 115 degrees cao (ft)	**A1**

(b) Answer: angle ACD = 115 degrees

Question 9

(180 - 56) / 2 seen (base angles of isosceles triangle)	**M1**
base angle ABC = ACB = 62 degrees (ft)	**A1**
180 - 62 = 118 degrees cao (ft), or 56 + 62 = 118	**A1**

Answer: angle ACD = 118 degrees

Question 10

interior angle of a regular hexagon = 120 degrees found or used	**M1**
120 + 120 + 60 = 300 seen (oe)	**M1**
360 - 300 = 60 degrees cao	**A1**

Answer: 60 degrees

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